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EXAMINER	
RATCLIFFE, LUKE D	

ART UNIT	PAPER NUMBER
3662	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/560,432	BRAUNECKER ET AL.
	Examiner	Art Unit
	Luke D. Ratcliffe	3662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 6-7, 10, 13-16, 18, 19, 22, 24, 29, and 32 rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (6057916) in view of Hardy (4474467).

Referring to **claims 1 and 13**, Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref 40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima does not shows the wavefront of the radiation is focused indirectly or directly onto the sensor.

Hardy shows a similar device that includes the use of a wavefront sensor to determine the slope of the incoming wave (column 1 line 60-65) and the wavefront of the radiation is focused on the sensor (figure 1). It would have been obvious to modify Kitajima to include the use of a wavefront sensor because this allows for a more simple

approach to determine slope of the wavefront to in turn determine inclination and is a simple substitution of one known element for another to yield predictable results.

Referring to **claim 2**, Kitajima shows a similar optical inclinometer that uses a liquid (figure 6).

Referring to **claim 3**, Kitajima shows a radiation source, medium, and detector are arranged so that the radiation is fed substantially perpendicular to at least one surface of the medium during a passage through the medium (figure 6).

Referring to **claim 6**, Kitajima shows the detector is mounted indirectly or directly on a container containing the medium (figure 6).

Referring to **claim 7**, Kitajima shows the detector has a detector surface which resolves in two dimensions (figure 6 Ref 40a-40d).

Referring to **claim 10**, Kitajima shows at least one deflection element is arranged in the beam path from the radiation source to the detector (figure 6 Ref 5a).

Referring to **claim 14**, Kitajima shows on evaluation of the signals, an analysis of the deviation of the wavefront from the wavefront before an interaction with the medium is effected (column 14-15).

Referring to **claim 15**, Kitajima shows on recording of the signals and or on evaluation of the signals, a reconstruction of the wavefront before an interaction of the medium is effected (column 14-15).

Referring to **claims 16 and 32**, Kitajima shows on recording of the signals individual image points of the detector are selected (column 14).

Referring to **claim 18**, Kitajima shows on recording the signals different apertures are correlated with one another (column 14).

Referring to claim 19, Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref 40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima does not explicitly teach compensating for vibrations and/or random fluctuations but this is well known and adds no new or unexpected results.

Referring to **claims 22 and 29**, Kitajima shows the radiation source is a semiconductor laser or an led (figure 6 Ref 1).

Referring to **claim 24**, Kitajima shows the orientation of the detector surface is parallel to the orientation of the surface of the medium (figure 6).

Referring to claim 30, Kitajima shows the information about the wavefront is in a form function of the wavefront (figure 6).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (6057916) in view of Hardy (4474467) as applied to claims 1-3, 6-7, 10, 13-16, 18, 19, 22, 24, 29, and 32 above, and further in view of Neal (6376819).

Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref

40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima does not shows the wavefront of the radiation is focused indirectly or directly onto the sensor.

Hardy shows a similar device that includes the use of a wavefront sensor to determine the slope of the incoming wave (column 1 line 60-65) and the wavefront of the radiation is focused on the sensor (figure 1). It would have been obvious to modify Kitajima to include the use of a wavefront sensor because this allows for a more simple approach to determine slope of the wavefront to in turn determine inclination and is a simple substitution of one known element for another to yield predictable results. However Kitajima does not show a Shack Hartmann wavefron sensor.

Neal shows a similar device that includes a Shack Hartmann wavefron sensor (column 1). It would have been obvious to modify Kitajima to include the wavefront sensor as shown by Neal because this is a combination of prior art elements according to known methods to yield predictable results.

Claims 4, 20, 21, 23, 31, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (6057916) in view of Hardy (4474467) as applied to claims 1-3, 6-7, 10, 13-16, 18, 19, 22, 24, 29, and 32 above, and further in view of Yertoprakhov (6476943).

Referring to claims 4 and 20, Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref 40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima does not shows the wavefront of the radiation is focused indirectly or directly onto the sensor.

Hardy shows a similar device that includes the use of a wavefront sensor to determine the slope of the incoming wave (column 1 line 60-65) and the wavefront of the radiation is focused on the sensor (figure 1). It would have been obvious to modify Kitajima to include the use of a wavefront sensor because this allows for a more simple approach to determine slope of the wavefront to in turn determine inclination and is a simple substitution of one known element for another to yield predictable results. However Kitajima does not show the detector has at least one diffractive element which is arranged on an array of microlenses.

Yertoprakhov shows at least one diffractive element which is arranged on an array of microlenses (figure 12). It would have been obvious to modify Neal to use the microlenses as shown by Yertoprakhov because this is a combination of prior art elements according to known methods to yield predictable results.

Referring to **claims 21 and 36**, Yetoprakhov shows the diffractive element is a hologram or Dammann grating (figure 12).

Referring to **claims 23, 31, and 35**, Yetoprakhov shows the use of a CMOS microcamera or a CCD microcamera (figure 15A Ref 111). It would have been obvious to modify Kitajima to include the CCD microcamera as shown by Yetoprakhov because this is a combination of prior art elements according to known methods to yield predictable results.

Claims 8, 9, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (6057916) in view of Hardy (4474467) as applied to claims 1-3, 6-7, 10, 13-16, 18, 19, 22, 24, 29, and 32 above, and further in view of Neal (6184974).

Referring to claims 8 and 25, Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref 40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima does not shows the wavefront of the radiation is focused indirectly or directly onto the sensor.

Hardy shows a similar device that includes the use of a wavefront sensor to determine the slope of the incoming wave (column 1 line 60-65) and the wavefront of the radiation is focused on the sensor (figure 1). It would have been obvious to modify Kitajima to include the use of a wavefront sensor because this allows for a more simple approach to determine slope of the wavefront to in turn determine inclination and is a

simple substitution of one known element for another to yield predictable results. However Kitajima does not show the detector and radiation source are arranged on a common base.

Neal (6184974) shows the detector and radiation source are arranged on a common base being a circuit board (figure 1b). It would have been obvious to modify Kitajima because this is a combination of prior art elements according to known methods to yield predictable results.

Referring to **claim 9**, Kitajima shows a radiation source, medium, and detector are arranged so that the radiation is fed substantially perpendicular to at least one surface of the medium during a passage through the medium (figure 6).

Claims 11 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (6057916) in view of Hardy (4474467) as applied to claims 1-3, 6-7, 10, 13-16, 18, 19, 22, 24, 29, and 32 above, and further in view of Kablan (4290043).

Referring to claims 11 and 26, Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref 40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima does not shows the wavefront of the radiation is focused indirectly or directly onto the sensor.

Hardy shows a similar device that includes the use of a wavefront sensor to determine the slope of the incoming wave (column 1 line 60-65) and the wavefront of

the radiation is focused on the sensor (figure 1). It would have been obvious to modify Kitajima to include the use of a wavefront sensor because this allows for a more simple approach to determine slope of the wavefront to in turn determine inclination and is a simple substitution of one known element for another to yield predictable results. However Kitajima does not show at least one diffractive and/or optical gradient element, in particular a Fresnel lens is arranged in the beam path from the radiation source to a detector.

Kablan shows at least one diffractive and/or optical gradient element, in particular a Fresnel lens is arranged in the beam path from the radiation source to a detector (figure 8 Ref 88). It would have been obvious to modify Neal because this is a combination of prior art elements according to known methods to yield predictable results.

Claims 12, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (6057916) in view of Hardy (4474467) as applied to claims 1-3, 6-7, 10, 13-16, 18, 19, 22, 24, 29, and 32 above, and further in view of Shira (20010024270).

Referring to claims 12, 27, and 28, Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref 40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima

does not shows the wavefront of the radiation is focused indirectly or directly onto the sensor.

Hardy shows a similar device that includes the use of a wavefront sensor to determine the slope of the incoming wave (column 1 line 60-65) and the wavefront of the radiation is focused on the sensor (figure 1). It would have been obvious to modify Kitajima to include the use of a wavefront sensor because this allows for a more simple approach to determine slope of the wavefront to in turn determine inclination and is a simple substitution of one known element for another to yield predictable results. However Kitajima does not show a geodetic device in particular a telemeter or plumb staff having an inclinometer of claim 1.

Shira teaches an optical inclinometer in a telemeter or plumb staff. It would have been obvious to modify Neal because this is the use of a known technique to improve similar devices in the same way.

Claims 17 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitajima (6057916) in view of Hardy (4474467) as applied to claims 1-3, 6-7, 10, 13-16, 18, 19, 22, 24, 29, and 32 above, and further in view of Hirohara (20030011757).

Referring to claims 17 and 33, Kitajima shows an optical inclinometer including a radiation source (figure 6 Ref 1), a medium of which is inclination dependent (figure 6 Ref C), a detector (figure 6 Ref 40), an evaluation unit (column 14 line 9-20), a radiation source and detector being arranged so that the wavefront is focused indirectly or directly onto the detector (figure 6), and that the detector has a wavefront sensor or the

detector is in the form of a wavefront sensor (figure 6 Ref 40). However Kitajima does not shows the wavefront of the radiation is focused indirectly or directly onto the sensor.

Hardy shows a similar device that includes the use of a wavefront sensor to determine the slope of the incoming wave (column 1 line 60-65) and the wavefront of the radiation is focused on the sensor (figure 1). It would have been obvious to modify Kitajima to include the use of a wavefront sensor because this allows for a more simple approach to determine slope of the wavefront to in turn determine inclination and is a simple substitution of one known element for another to yield predictable results. However Kitajima does not show evaluation of the signals, the form function is derived by means of a polynomial approach.

Hirohara shows a similar device that shows evaluation of the signals, the form function is derived by means of the Zernike polynomial approach (paragraph 144-145). It would have been obvious to modify Neal because this is a combination of prior art elements according to known methods to yield predictable results.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luke D. Ratcliffe whose telephone number is (571)272-3110. The examiner can normally be reached on 10:00-5:00 M-Sun.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LDR

/Thomas H. Tarcza/

Supervisory Patent Examiner, Art Unit 3662